Advanced Concept Technology Demonstration FY06 Candidate

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to Joint Seabased Theater Access Workshop

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FY06 ACTD Candidate

Joint Warfighting Problem

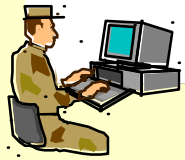
Joint Force Commanders cannot fully exploit multiple austere sea ports of debarkation (SPOD) to support warfighting requirements for the rapid throughput of combat power and sustainment into the theater of operations and intra-theater operational maneuver.

- Many austere SPODs that could be operationally useful to the JFC are not accessible by current and future intra-theater sealift vessels.
- Current databases and planning tools do not include characterization of austere sea and river ports.
- Medium/heavy high speed sealift lack the means to rapidly discharge combat power and sustainment at austere SPODs or JLOTS operations due to bulky and complex causeway systems that can only be delivered on medium to deep draft, slow-moving vessels. Existing causeway systems are not transportable or employable by the Joint High Speed Vessel (JHSV).
- Early entry distribution of sustainment cargo is too slow across

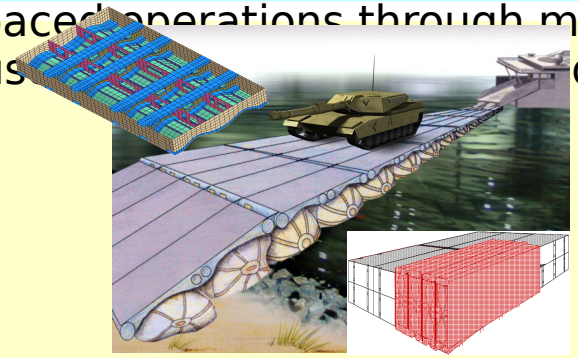
Advanced Concept Solution

Concept directly supports Joint Force Projection & Sustainment and Seabasing Joint Integrating Concepts (JIC); also supports key UofA CONOPS enabler: Assured Mobility.

- Provides capabilities to allow the Joint Force Commander (JFC) to exploit and optimize the throughput of current watercraft and future high speed sealift vessels for intra-theater lift.
- Mitigates threat anti-access strategies.
- Speeds deployment to reduce force closure timelines of building combat power.
- Supports fast-paced operations through more rapid deployment.
- Operationally us[illegible]de available to the JFC.

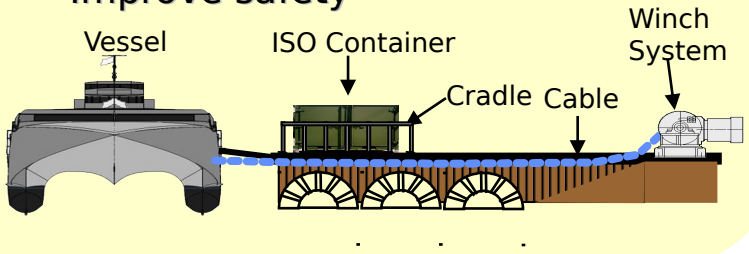


SPOD Planning Tool
- Mission planning hardware & software
- Rapid remote SPOD assessment



Lightweight Modular Causeway System (LMCS)
- Interface w/ JHSV
- Reduce employment time
- Compatible with current lighters

LMCS Container Handling System (CHS)
- Increase throughput
- Reduce Materiel Handling Equipment (MHE)
- Improve safety



JETA SPOD Concept of Operations

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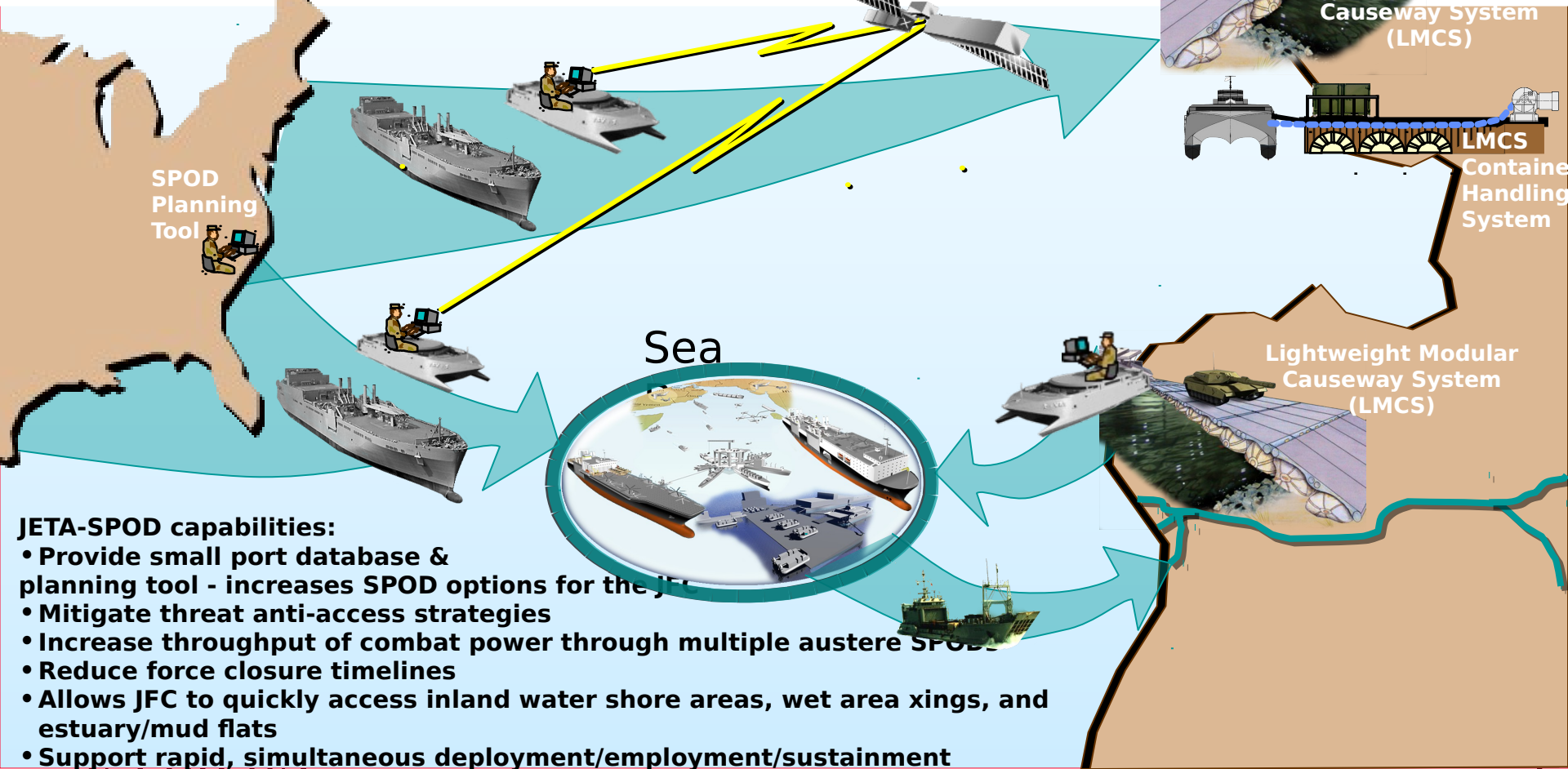
Joint Enable Theater Access Sea Ports Of Debarkation

Joint Enable Theater Access -SPOD

Ensure Joint Forces can deploy and freely enter any theater of operations:

- ***Mitigate adverse effects of the environment (terrain, weather, enemy action, etc.)***
- ***Significantly increase number of SPOD theater entry points available to the JF***
- ***Rapidly upgrade existing infrastructure at austere SPODS***
- ***Enhance JHSV entry capabilities into austere SPODs***



JETA-SPOD capabilities:

- **Provide small port database & planning tool - increases SPOD options for the JFC**
- **Mitigate threat anti-access strategies**
- **Increase throughput of combat power through multiple austere SPODs**
- **Reduce force closure timelines**
- **Allows JFC to quickly access inland water shore areas, wet area xings, and estuary/mud flats**
- **Support rapid, simultaneous deployment/employment/sustainment**

Demonstration Plan

- **Incremental modeling, laboratory testing, and field demonstrations will be conducted to determine overall effectiveness of the technologies.**
- **Field demonstrations will be conducted to determine the adequacy of JETA-SPOD CONOPS and suitability for the various ACTD technology focus areas.**
- **The demonstrations will provide adequate test data to independent evaluators to support the military utility assessment.**
- **Final demonstration of SPOD planning tool, LMCS, and CHS will be conducted in an integrated operational environment.**

Core Technologies

Technology	Technology Readiness Level	Risk Assessment	Risk reduction measures/comments
SPOD Mission Planning Tools	TRL 6	Low Risk	Data can be developed as module for existing databases.
Lightweight Modular Causeway System (LMCS)	TRL 6	Low Risk	Experimental tests with various LMCS versions will have already been developed, constructed, and employed. A very sound technical base and concept of initial cost will exist.
LMCS Container Handling System (CHS)	TRL 6	Low Risk	Component technical readiness is mature for CHS; the main technical risk is integration of CHS and LMCS.

LMCS is a Hybrid of Tactical Fixed Bridging and Floating Causeway Systems

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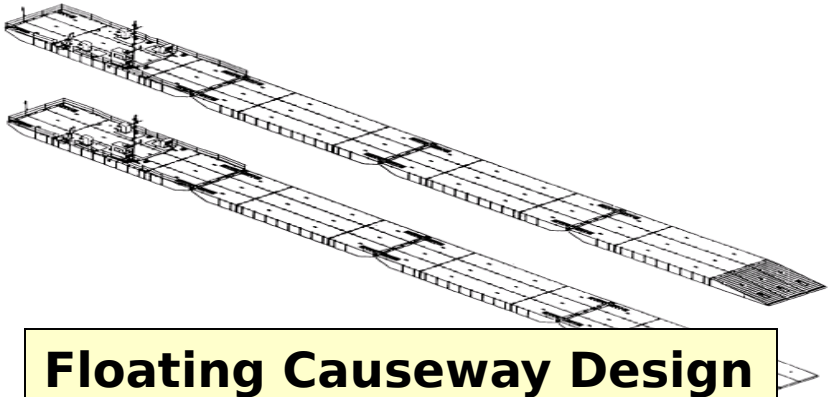
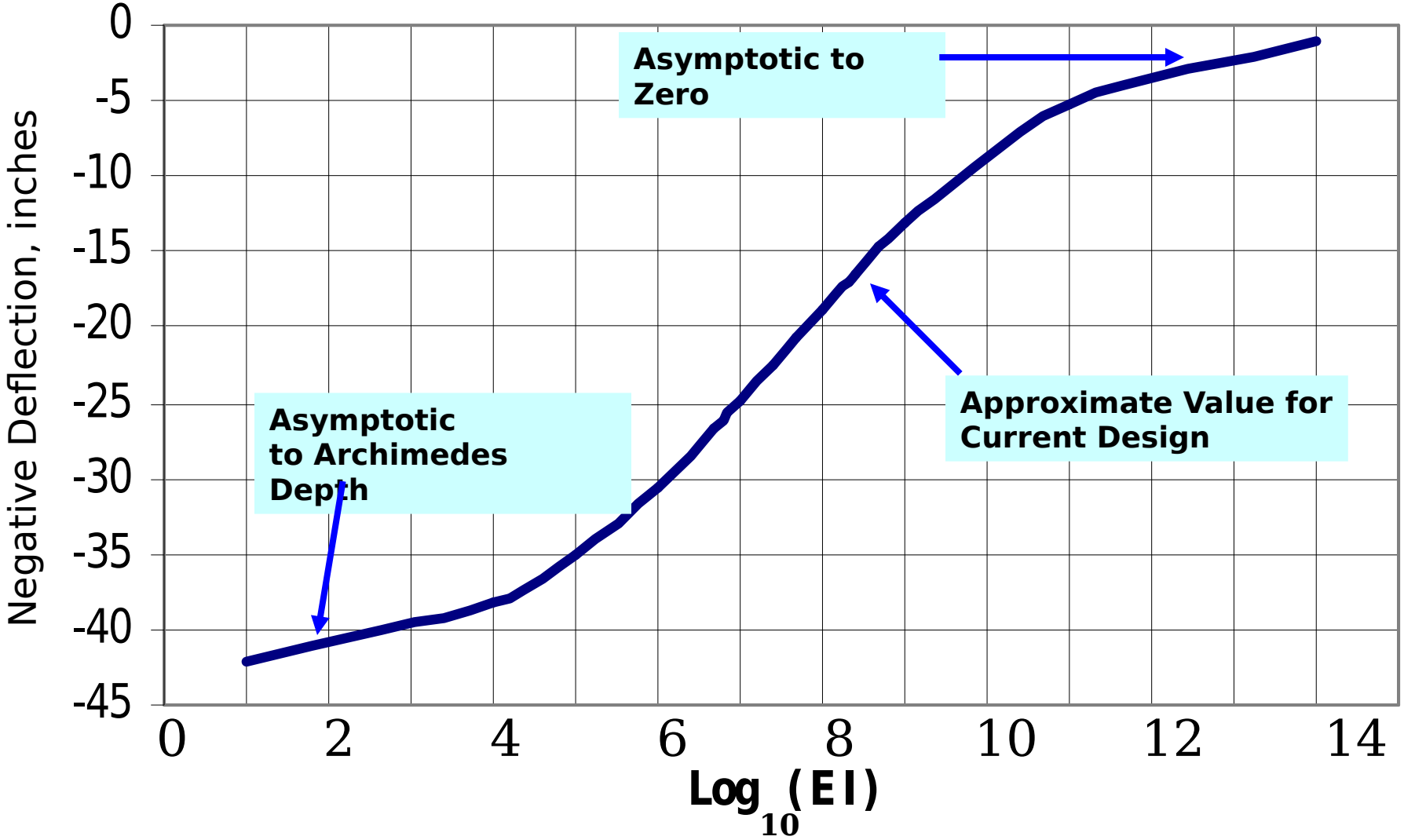
Tactical bridging design concept: Structural stiffness supports entire load between fixed supports



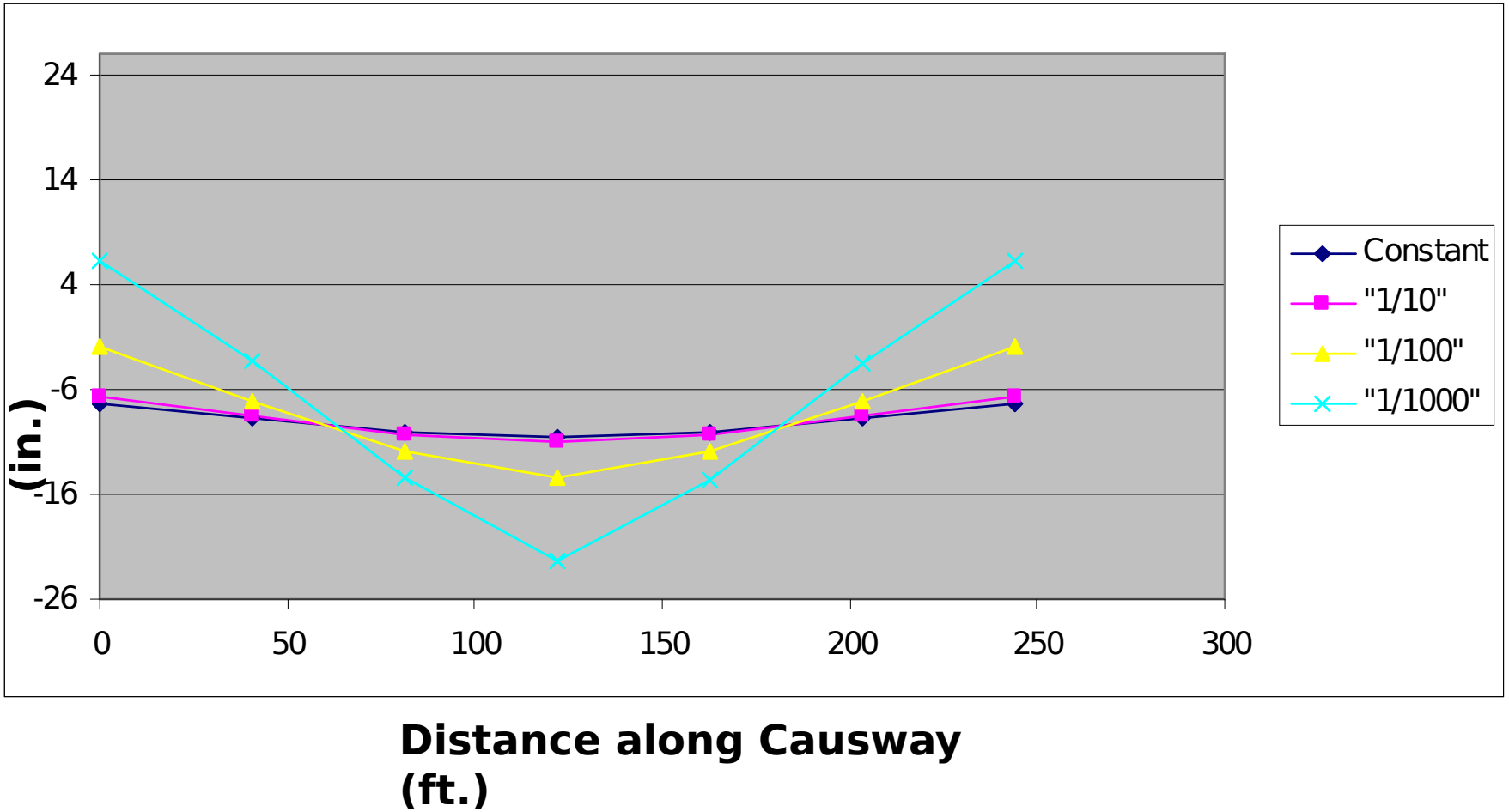
Floating Causeway Design Concept: Local buoyancy supports all loads

LMCS - Solves coupled equations for optimal structural stiffness combined with floatation: - Analytical Solutions, Finite Element Analysis, Physical Models - Mid-scale Demo (1:3 scale) - USMC funding

Deflection vs Stiffness

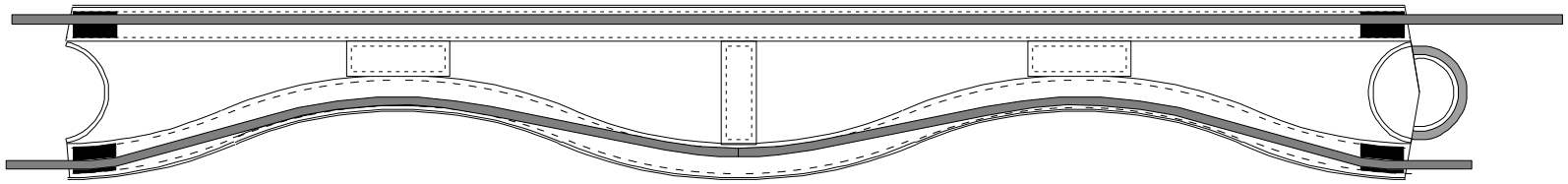


Deflection Under M1A2 Loading



JMCS Innovative Design Concept:

High-Strength Fiber Connections



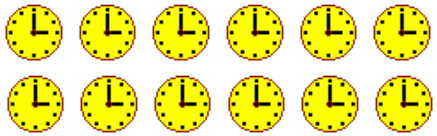
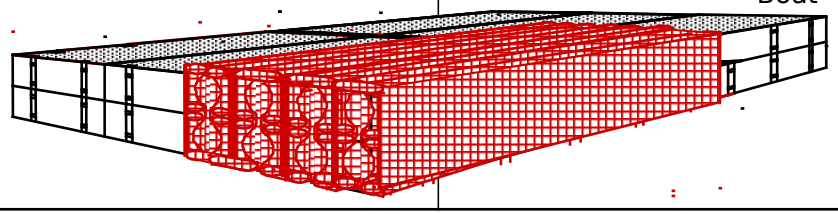
SIDE VIEW

- **Greatly facilitates deployment – No in-water connections**
- **Significantly reduces effects of excess loads on structure (c**
- **Retains overall system stiffness of steel connectors**

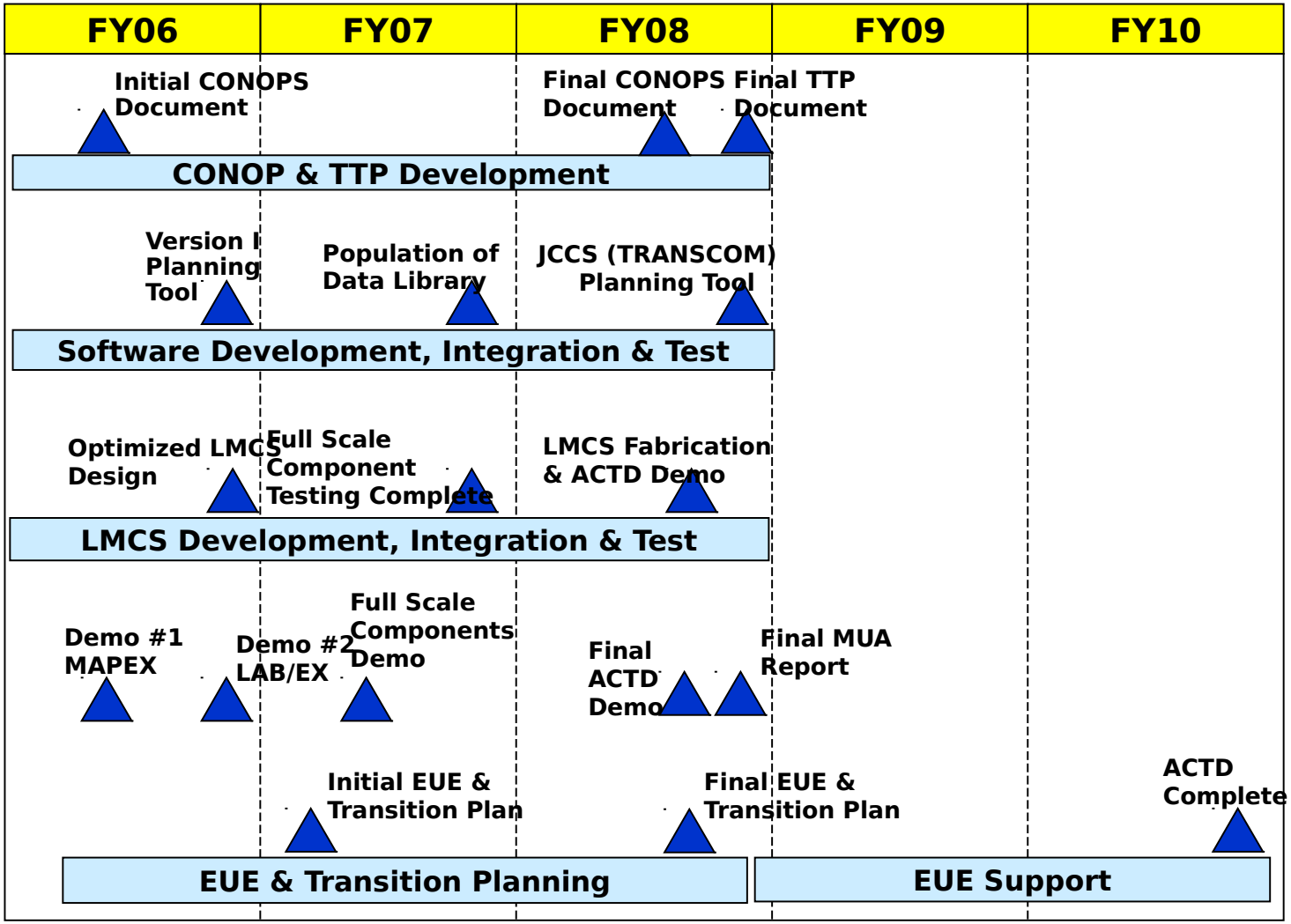
Metrics

Parameters	Baseline	Threshold	Objective
SPOD Planning Tools – % of worldwide small ports covered by throughput prediction information tool	Near zero	50%	80%
# of TSV-Compatible Ports	X	5X	8X
Causeway System – weight	MCS	↓50%	↓60%
Causeway System – volume	MCS	↓50%	↓65%
Employment time	~8 hrs/section (MCS)	3hrs/section	2hrs/section
Port Throughput Rate	X	2X	4X
Safety considerations	Numerous in-water connections per section	No in-water connections per section	No in-water connections per section

MCS vs LMCS

	MCS	LMCS
Assembly time		
Number of personnel required for assembly		
Supporting equipment required	Strategic Ship Side-Loading Warping Tug	JHSV Rigid-Hulled Inflatable Boat
Space & Weight		

Schedule


FY06
FY07
FY08
FY09
FY10
CONOPS & TTPs
Planning Tool
Development & Integration
LMCS/CHS Development & Integration
Demonstrations & MUA
EUE & Transition
Initial CONOPS Document
Final CONOPS Document
Final TTP Document
CONOP & TTP Development
Version I Planning Tool
Population of Data Library
JCCS (TRANSCOM) Planning Tool
Software Development, Integration & Test
Optimized LMCS Design
Full Scale Component Testing Complete
LMCS Fabrication & ACTD Demo
LMCS Development, Integration & Test
Demo #1 MAPEX
Demo #2 LAB/EX
Full Scale Components Demo
Final ACTD Demo
Final MUA Report
Initial EUE & Transition Plan
Final EUE & Transition Plan
ACTD Complete
EUE & Transition Planning
EUE Support

Players

- **Lead Service:** Army
- **Sponsoring Combatant Command:** USPACOM
- **Operational Manager (OM):** USPACOM, J4
  - **OM Team:** USARPAC, MARFORPAC
- **Technical Manager (TM):** Army ERDC, Army TARDEC, USMC (TBD)
- **Supporting CoCOMs:** USTRANSCOM, USJFCOM
- **Supporting Services:** USN, USMC
- **Transition Manager (XM):** PM Army Watercraft Systems, PM Force Projection, PEO Ships (TBD)
- **Coalition:** Australia

Transition Strategy

- **Joint transition includes:**
  - Army submit POM issue for FY08-13
  - Extended User Evaluation of Residual Package by PACOM
  - Follow-on System Development & Demonstration, Production and Fielding with PM AWS, PEO Ships
- **Targeted Program(s) of Record:**
  - Modular Causeway System, Joint High Speed Vessel, Military Intelligence Database (MIDB)

Residuals for Extended User Evaluation

- **Residuals for USPACOM:**
  - Small Port Analysis Software - Initial spiral with USPACOM SPOD data – FY06
  - Expanded Small Port Characterization Database and Analysis Software – FY08
  - One (1) LMCS (120-150ft) – FY08
  - One (1) LMCS CHS – FY08

ACTD Costs
(Yearly, $M)

Developmental Prototypes

Item	FY06	FY07	FY08	FY09	FY10	TOTAL
SPOD select/assess SW	.75	.75	1.00			2.50
LMCS	3.20	4.20	5.50			12.90
CHS	1.00	1.00	1.00			3.00
Sponsor/Operational Mgt	.75	1.00	.75			2.50
Demonstrations		.50	2.50			3.00
Residual Support				.50	.50	1.00
Total	5.70	7.45	10.75	.50	.50	**24.90**

Funding Sources

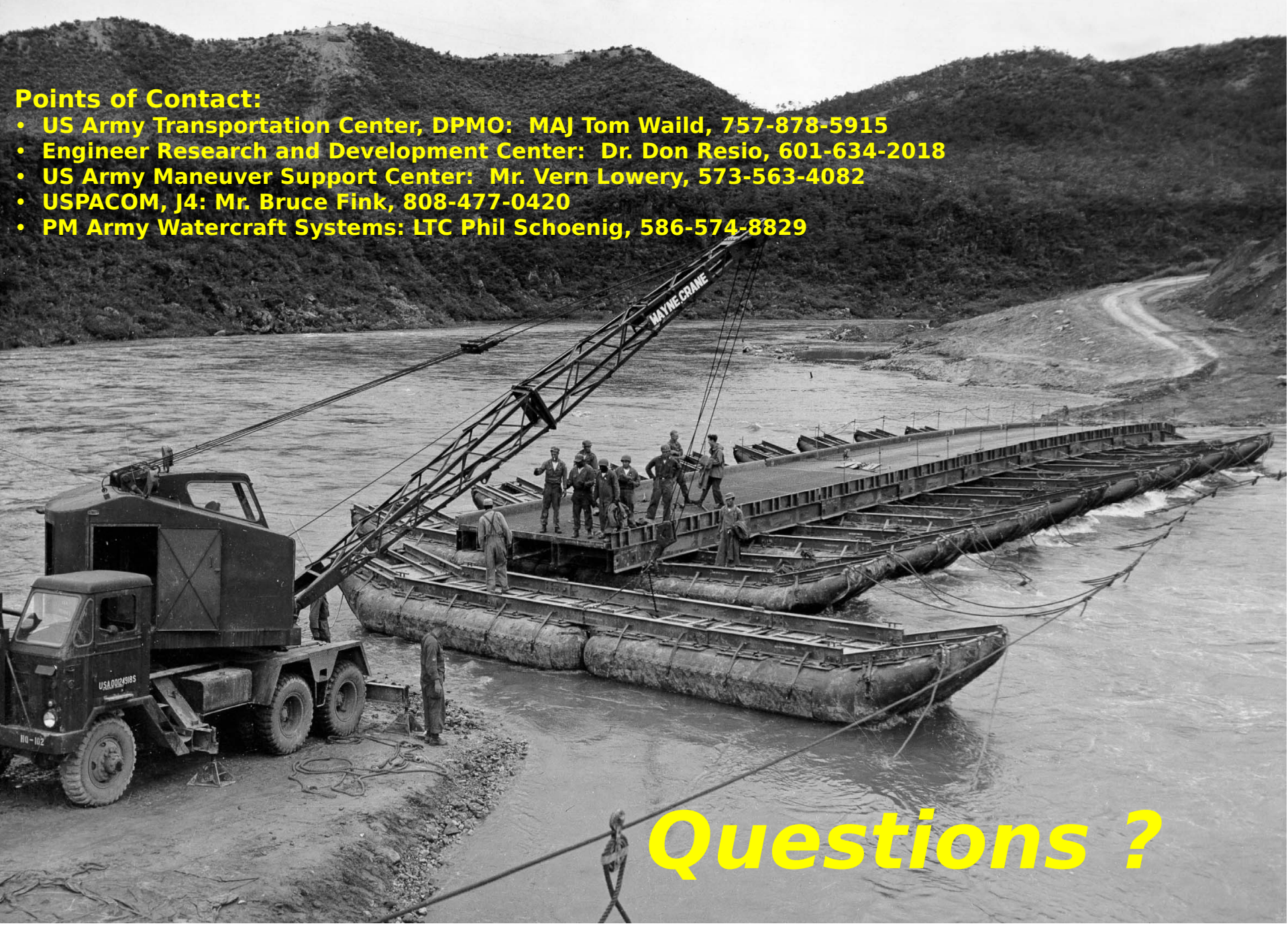
Joint Enable Theater Access - Sea Ports of Debarkation (JETA-SPOD)						Dollars in Thousands					
Organization	Commitment	Type of Funding	Funding Description	Program Element (PE)	Project #	FY-06	FY-07	FY-08	FY-09	FY-10	Total
Army S&T	Committed	RDT&E	Cash	602784A		$3,200	$2,000	$2,800			$8,000
USTRANSCOM	Committed	RDT&E	Cash	TBD		$1,250	$1,500	$1,500			$4,250
USMC	Uncommitted	TBD	TBD								
PM Army Watercraft Systems	Committed	O&M	TBD (JHSV hours)	O&M		DINK	DINK	DINK			DINK
TBD	Uncommitted	TBD	TBD	TBD							$6,150
			Total Service/Def Agency/COCOM			$4,450	$3,500	$4,300			$18,400
DUSD (AS&C)		RDT&E/6.3	Cash	0603750D8Z	523	$2,000	$1,000	$2,500	$500	$500	$6,500
					Total:	$6,450	$4,500	$6,800			$24,900
Committed:	$12,250										
Percent Committed	49%						AS&C Percent Total:				26%
Funding Risk:	MED						AS&C Percent Cash:				26%

**USMC provided 1.45M (.9M in FY04, .55M in FY05) to support small port analysis and LMCS development efforts*

Summary

Technical	Schedule	Cost	Management
• Port Planning Software Tool (TRL=6) • Lightweight Modular Causeway System (LMCS) (TRL=6) • LMCS Container Handling System (TRL=6)	• Dependency on vessel availability for demos • LMCS and CHS schedules can run concurrently to minimize risk	• $6M UFR (after proposed OSD contribution) • Pursuing additional USN/USMC In-Kind funding	• Management Team has extensive ATD and ACTD experience
LOW Risk	LOW Risk	MEDIUM Risk	LOW Risk

No Show Stoppers



Points of Contact:

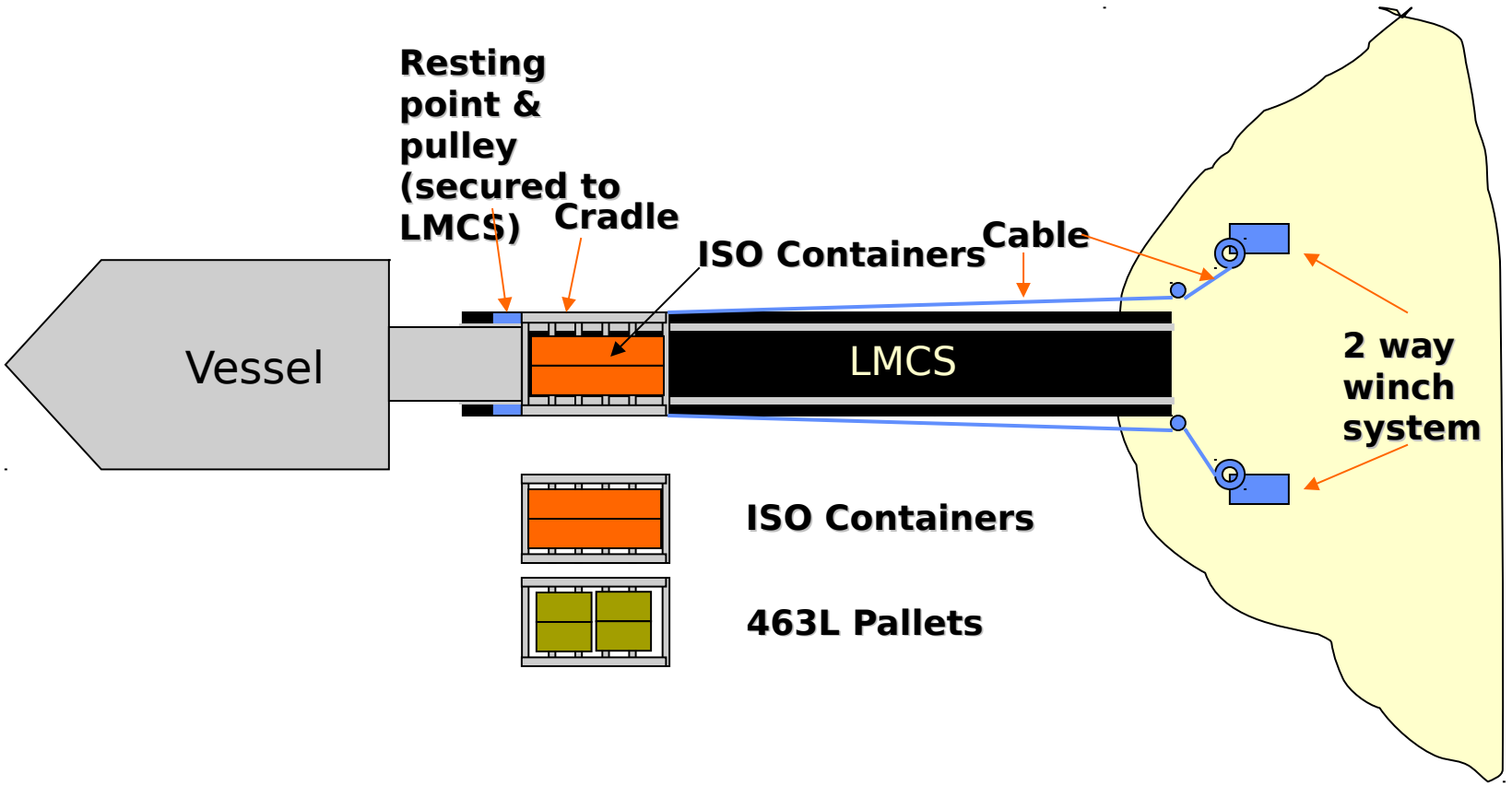
- **US Army Transportation Center, DPMO: MAJ Tom Waild, 757-878-5915**
- **Engineer Research and Development Center: Dr. Don Resio, 601-634-2018**
- **US Army Maneuver Support Center: Mr. Vern Lowery, 573-563-4082**
- **USPACOM, J4: Mr. Bruce Fink, 808-477-0420**
- **PM Army Watercraft Systems: LTC Phil Schoenig, 586-574-8829**

Back Up

Key Briefings and Support

- MANSCEN Letter of Support – MG Von Antwerp – Jun 04
- Chief of Transportation Support – MG Geehan – Jul 04
- Joint Staff, J4 – Aug 04
- USJFCOM, J8/9 – Mr. Ryneska – Sep 04
- PM Force Projection – COL Goddette – Sep 04
- CDR, ERDC – COL Rowan – Sep 04
- Director, ERDC – Dr. Houston – Sep 04
- USPACOM, J41, J43 – COL Andrews, COL Gitto – Oct 04
- USARPAC, Experimentation – Andrew Wood – Oct 04
- Army Power Projection Program, Council of Colonels – Nov 04
- USTRANSCOM, J5, JICTRANS – Nov 04, Jan 05
- TRADOC Futures Center – COL Lemire – Nov 04
- ASAALT – Mr. Graver – Nov 04
- HQDA, G8-FDT – Mr. Franco – Nov 04
- HQDA, G3, S&T LNO – Mr. Murphy – Nov 04
- CG MANSCEN – MG Castro – Nov 04
- High Speed Sealift – ExecCom – N42, Mr. Kaskin, chair, CAPT Orban – Dec 04
- MARFORPAC AC/S, G4, PACOM Branch Chief – COL Yff – Dec 04
- USPACOM, J4 – BG Kennon – Dec 04
- DUSD (AS&C) – Mr. Winegrad, Mr. Shriber – Dec 04
- DUSD (AS&C) – Ms. Payton (Breakfast Club) – Jan 05
- Defense Science Board – GEN (Ret) Tuttle – Jan 05

Material Handling System for LMCS



Aerial View

Joint Enable Theater Access – Sea Ports of Debarkation (JETA-SPOD)

FY06 ACTD

JETA SPOD

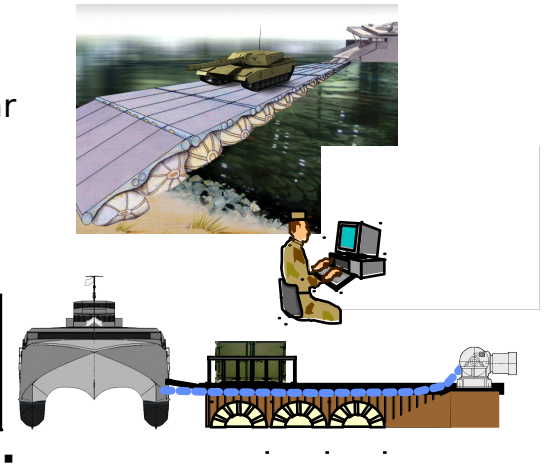
Joint Enable Theater Access Sea Ports Of Debarkation

- **Problem: Joint Force Commanders cannot exploit multiple austere sea ports of debarkation (SPOD) for the rapid throughput of combat power and sustainment into the theater of operations and intra-theater operational maneuver**
  - Current databases/planning tools lack austere sea/river ports.
  - Current sealift lacks relies on bulky causeway systems that can only be delivered on slow moving vessels.
  - Early entry container handling operations are too slow across current causeway systems.
- **Objectives:** Demonstrate a system to allow rapid discharge and optimize throughput of high speed connector platforms to austere SPODs.
  - Demonstrate planning/decision support tool to assist warfighters' assessment and selection of austere SPOD options.
  - Unload vehicles and containers from watercraft using a causeway system and container handling system

Solution:

- SPOD Planning Tool
- Lightweight Modular Causeway System (LMCS)
- LMCS Container Handling System (CHS)

A solution for current fleet watercraft as well as future Joint High Speed Vessel.



Technologies:

- High tensile strength fibers
- Quick deploy lightweight pneumatics

- **Participants**
  - COCOM Sponsor: PACOM
  - OM: PACOM, J4
  - TM: US Army Engineering R&D Center (ERDC)
  - XM: Army PM Force Projection, PEO Ships
  - Others: TRANSCOM, USMC
- **Schedule**
  - FY06: Initial CONOPS doc; 1st SPOD Planning tool spiral
  - FY07: Full Scale Component Demos
  - FY08: Final CONOPS doc; SPOD planning tool; Final System Utility Assessment

- **Residuals**
  - SPOD Planning Tool
  - One LMCS
  - One LMCS CHS
- **Comments**
  - Endorsed by Chief of Transportation (29 Jul 04)
  - Endorsed by CG, MANSCEN (28 Jun 04)
  - Supported by USTRANSCOM, JFCOM
  - Warfighter support: USARPAC, MARFORPAC
  - Total ACTD Cost ($24.9M)

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